

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Oscar Ming Kin Law
Serial No.: 10/820,556
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Examiner: Anh Quan Tra
Art Unit: 2816
Docket No.: 00100.04.0002

Title: **ADAPTIVE SUPPLY VOLTAGE BODY BIAS APPARATUS AND
METHOD THEREOF**

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Commissioner for Patents
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REMARKS FOR PRE-APPEAL BRIEF REQUEST FOR REVIEW

Dear Sir:

Applicants are filing this paper concurrently with a Pre-Appeal Brief Request For Review form PTO/SB/33 and a Notice of Appeal. Applicants respectfully submits that the Examiner's rejections include clear errors because the proposed combination of references: (i) is contrary to teachings against the proposed combination; (ii) would improperly change the principle of operation of one or both of the combined references; (iii) would obviate the very purpose of the references; and (iv) lacks a proper motivation to combine.

Claims 1, 5-10, 12-20, 23 and 24 are currently pending. Summarized, and not by way of limitation, the currently pending claims are directed to the adaptive control of supply voltages and body biases for computing devices each having different ones of a plurality of different threshold voltages.

Claims 1, 3-10, 12-20 and 22-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Katoh in view of Miyazaki. The Katoh reference is briefly described in Applicant's response (pages 9-10) to the Office Action mailed July 2, 2007, whereas the Miyazaki reference is briefly described in Applicant's response (page 9) to the Office Action

mailed September 20, 2006. In short, Katoh teaches the provision of multiple threshold switching devices (i.e., low and high threshold MOSFETs) such that signal paths having varying delays and varying levels of leakage current may be provided, i.e., mixing high and low threshold switching devices so as to meet any necessary speed requirements without needlessly incurring leakage currents by making *all* of the switching devices low threshold devices. Miyazaki, in turn, teaches an integrated circuit that is provided with control circuits for controlling a power supply voltage, a substrate bias voltage and a clock frequency for the integrated circuit or multiple blocks thereof. In the rejection, it is asserted one would be motivated to combine the multiple threshold devices taught by Katoh with the control circuitry taught by Miyazaki in order to selected the desired delay value.

For the reasons given below, Applicant believes the combination of Katoh in view of Miyazaki is improper and respectfully submits that use of this basis for the rejection of the currently pending claims constitutes clear error.

First, the suggested combination of Katoh and Miyazaki is improper because Katoh expressly teaches away from the suggested combination. (See M.P.E.P. § 2141.02(VI): “A prior art reference must be considered in its entirety . . . including portions that would lead away from the claimed invention.”) In particular, Applicant notes col. 1, line 52 – col. 2, line 63 of Katoh, where the possibility of controlling body bias voltages in order to reduce leakage current was considered by Katoh. However, as the cited passage makes perfectly clear, particularly in light of the subsequent teachings, Katoh specifically rejected an adaptive control approach in favor of provision of multiple threshold devices that may be configured at the time of circuit design to provide delay paths that meet the necessary speeds, but that also minimize the number of devices having high leakage current. In light of this, it is improper to combine the control circuitry of Miyazaki with the multiple threshold devices of Katoh because Katoh clearly teaches away from

such a combination. (See M.P.E.P. § 2145(X)(D)(2): “It is improper to combine references where the references teach away from their combination.”)

Second, and ignoring for the moment the express teachings of Katoh against the suggested combination, Applicant respectfully submits that one having ordinary skill in the art would not be motivated to combine the multiple threshold devices of Katoh with the control circuitry taught by Miyazaki because to do so would change a basic operating principle of Katoh. Katoh balances the conflicting requirements of speed versus current leakage by providing enough multiple threshold devices such that the delays in any given signal path may be specified at the time of circuit design without incurring more than the necessary amount of leakage current. As a result, one having ordinary skill in the art would *not* be motivated to adjust delay values using the control circuitry of Miyazaki because to do so would interfere with the desired speed versus leakage current balance provided during the circuit’s design. Stated another way, a person of ordinary skill in the art would not combine the teachings of Miyazaki with those of Katoh because to do so would change the basic operating principle of Katoh. (See M.P.E.P. § 2143.01(VI): “If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.”) Applicants have noted Examiner’s response to this line of argument (see Office Action mailed November 9, 2007, “Response to Arguments”, Section 5) that, in essence, Katoh teaches a delay circuit having multiple threshold devices and Miyazaki teaches a control circuit for controlling a similar type of delay circuit; therefore, if one wants to control the delays of Katoh’s delay circuit, one would be motivated to employ Miyazaki’s control circuitry. However, Applicant respectfully submits that this line reasoning ignores the purpose of Katoh described above (in addition to ignoring Katoh’s express rejection of such a combination, as noted above), i.e., that Katoh seeks to balance the

speed versus leakage current trade off at the time a circuit is designed. (See, e.g., Katoh col. 2, lines 60-63; col. 3, lines 8-12)

Third, Applicants note the instructions of M.P.E.P. § 2143.01(IV), which state that the proposed modification to a reference cannot render that reference unsatisfactory for its intended purpose and, closely related, the instructions of M.P.E.P. § 2143.02, which state that a modification to a reference is proper only when there is a reasonable expectation of success. In this vein, Applicants respectfully submit that the combination of Katoh and Miyazaki is improper to the extent that the resulting device would be so complex as to be impractical, thereby obviating the very purpose of Katoh and possessing little likelihood of success. As noted above, Katoh provides multiple threshold devices so as to allow a designer to design a circuit meeting the necessary speed requirements while simultaneously minimizing the number of high leakage gates employed. Because the high and low threshold gates illustrated in Katoh are not combined until such time as the circuit is designed according to the designated speed and leakage current requirements, it would be necessary to duplicate the control circuitry of Miyazaki for virtually every gate within Katoh's device since it would be impossible to know ahead of time how Katoh's gates would be combined. Such duplication of circuitry, even assuming that it is technically feasible, would necessarily make the resulting device exceeding complex and therefore unlikely to be used in practice.

Fourth, and finally, with regard to motivation to combine the references, the United States Supreme Court, in its *KSR* decision (*KSR International Co. v. Teleflex, Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007)), noted that "market forces" may provide sufficient motivation for making variations to prior art teachings. (*Id.* at ___, 82 USPQ2d at 1396) However, by implication, it must also be true that variations to prior art teachings that would run counter to such "market forces" would not be evident to practitioners in the art, thereby cutting against any

motivation to combine such prior art teachings. Applicant respectfully submits that the cited combination of Katoh and Miyazaki runs counter to the market forces applicable to devices of the type described by Katoh and Miyazaki. In particular, both Katoh and Miyazaki concern integrated circuits. It is widely known in the art of integrated circuits that complexity and cost go hand in hand—increased complexity of an integrated circuit translates directly into increased costs to eventual purchasers of such devices. As described above, the combination of Miyazaki's control circuitry with the multiple threshold devices of Katoh would result in an device of such increased complexity as to make the resulting cost increase prohibitive. To the extent that one of skill in the art would not be motivated to make changes to Katoh's device that cause it to be inordinately expensive, Applicants respectfully submit that one would not be motivated to combine the teachings of Katoh with Miyazaki.

For the reasons presented above, reconsideration and withdrawal of the rejection of the claims and subsequent issuance of a Notice of Allowance is respectfully requested.

Respectfully submitted,



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